

THE GENUS *LIPARIA* L. (PAP.)*

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ABSTRACT

The genus *Liparia* consists of two species, *L. splendens* (Burm. f.) J. J. Bos et de Wit comb. nov., and *L. parva* Vog. ex Walp.; the former species is divided into two subspecies. Several proposed species are reduced to synonymy. The identity of *Leucadendron splendens* Burm. f. as disclosed by De Candolle is supported. Genus and species are described and illustrated; historical notes and a key are included.

INTRODUCTION

Liparia L. is the type-genus to the subtribe *Lipariae* in the tribe *Genisteeae* (*Papilionaceae*).

The genus is endemic to the extreme south-western part of the Cape Province, Republic of South Africa. *Liparias* are showy flowering shrubs and subshrubs, rapidly becoming rare members of the typical "fijnbos" vegetation; they are among the protected wild flowers of the Cape.

Notwithstanding its rather singular appearance (at first sight *Liparia* seems proteaceous rather than papilionaceous) and other interesting characters, the genus never before seems to have been subject to a monographical study.

HISTORICAL NOTES

The first reference in literature concerning *Liparia* appeared in 1704, in John Ray's *Historia Plantarum* (III, "Dendrologia": 107 n. 65) where the author gives a short description preceded by the phrase name: *Genista africana rusci foliis* etc. Ray indicates Sherard as the source of his material. This implies the still earlier introduction of the plant in Sherard's gardens, where it probably was raised from seeds. Its attractive habit and its distribution which includes the sites of the earliest settlements at the Cape, account for the early dispatch of its seeds to European conservatories.

The first nomenclaturally legitimate publication occurred when N. L. Burmann published *Prodromus Flora Capensis* (1768). He described *Leucaden-*

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dron splendens with a Latin phrase (*l.c.*: 4); thereby the taxon was placed in *Proteaceae*, an unexpected error after Ray's correct classification. *Prodromus Flora Capensis* was based on the collection of Cape plants owned by J. Burmann, his father. Previous to the publication of *Prodromus Flora Capensis* (1760) Burm. f. visited Linnaeus and showed him his father's plants for identification purposes.

Many of these plants were new to science and Linnaeus described, and subsequently published them, mainly in the *Mantissa* of 1767. However, the first publication of *Liparia* L. as a new genus is to be found in the second *Mantissa* of 1771 where an extensive generic description is given and several species are described. Presumably, Linnaeus gave the name *Liparia* because of the waxy or fatty surface of the leaves or, possibly, on account of the silky gloss of the yellow flowers (Greek: *liparos* = fatty, or also, shiny).

Six species are placed in *Liparia* L. by Linnaeus but only two are described in detail, the remaining 4 are each provided with one single phrase.

Of the two species of *Liparia* described in detail, one, *L. graminifolia* L. was probably based on material sent to Linnaeus by Ryk Tulbagh, Governor of the Cape, but the source of *L. sphaerica* L., designated by Linnaeus as the most typical species of the new genus, is not so easy to establish. Judging from the elaborate description, Linnaeus must have had at his disposal ample flowering and fruiting material, which might have been provided by plants cultivated in a conservatory. As a reference (he ignores Burmann's publication of *Leucadendron splendens*), Linnaeus mentioned Ray's description (*l.c.*) which is not illustrated.

In the Linnean herbarium there are two flowering specimens named *Liparia sphaerica*, but both names are in the handwriting of Linnaeus the younger. The keen interest of Linnaeus in this new genus is illustrated by the announcement of the publication of the second *Mantissa* in the Stockholm paper *Lärda Tidningar* (no. 81 *d.d.* 17 October 1771) where Linnaeus selects a few major novelties from *Mantissa altera* including: "*Liparia sphaerica*, en af de wäckraste växter från Cap. Bon. Spei;!" (one of the most beautiful plants of the Cape of Good Hope; cf. Stearn, 3 prefaces of Lin. & R. Br., 1962).

Lamarck did not accept *Liparia* L. and included *Liparia* in *Borbonia* L. (cf. *Enc. Méth. Bot.* 1 (2): 435-438 (1783)).

Afterwards several new species in *Liparia* were proposed, mainly by Thunberg (*Prod. Fl. Cap.*: 123-124 (1794-1800)). De Candolle studied the generic delimitation once more in 1825 and excluded all but one of the proposed species, maintaining *Liparia* L. as a monotypic genus, represented by *Liparia sphaerica* L. (DC., *Mém. Fam. Leg.*: 190 etc. (1825)). The excluded species, De Candolle united into a new genus *Priestleya* DC. which was composed of 4 of the remain-

ing *Liparia* species published in Mantissa altera (the fifth being transferred to *Rafnia* Thunb.), of all 10 new proposed *Liparia* species by Thunberg (in Prod. Fl. Cap. l.c.), and of still 3 other species, proposed by Steudel, Andrews, and Sieber respectively. Of 2 remaining *Liparia* species referred to in literature, *L. hirsuta* Moench. (Meth. Pl. suppl.: 52 (1802)) was transferred to *Borbonia* L. while *L. badocana* Blanco (Fl. Filip. 1st ed. 1837, p. 597) turned out to be *Psoralea badocana* (Blanco) Blanco (Fl. Filip. 2nd ed.: 416 (1845); cf. Merrill, Enum. Phil. Fl. Pl. 2: 277 (1923)).

When publishing and delimiting *Priestleya* DC., De Candolle also established the identity of *Leucadendron splendens* Burm. f., mentioned before. De Candolle wanted to explain the unusual habit of *L. sphaerica* L. which made Burm. f. refer his specimen to *Proteaceae*. De Candolle established the fact that *Leucadendron splendens* Burm. f. and *Liparia sphaerica* L. were conspecific, of which he convinced himself by examining the type in Burmann's herbarium (DC. l.c.: 192).

Unfortunately the only specimen of *Liparia* (*Leucadendron*) *splendens* that exists today in the herbarium Burmann (G) was remounted at some later date, and has nothing to prove it to be the type of *Leucadendron splendens* Burm. f.

Although it is most regrettable that the type of *Leucadendron splendens* Burm. f. is no longer (with certainty) available, De Candolle's clearly expressed identification and discussion, added to his specialist study and knowledge of the group and to the unique and unmistakable appearance of *Liparia*, leave no reasonable doubt. Remounting Burmann's *Leucadendron splendens* may have caused the loss of the original label. Since *Leucadendron splendens* Burm. f. has priority, the new combination *Liparia splendens* (Burm. f.) J. J. Bos et De Wit is necessary.

After De Candolle's study several new species were proposed; their status and identity is explained further in the present revision.

It is to be noted that the Linnean type species occurs under the name *L. sphaerica* in all current literature and the earlier name, *Leucadendron splendens*, is not mentioned. De Candolle's findings of 1825 were almost completely overlooked by later authors, who appear to have followed earlier publications without any further research; G. Don, however, cited DC.'s statement in 1832 (l.c.: 131).

In the present paper, I have accepted De Candolle's concept of the genus. Owing to the kind help of numerous institutes and persons I was not only able to study *Liparia* in the field, but also to examine practically all specimens preserved in herbaria.

The year spent at Stellenbosch I remember with gratitude.

LIPARIA L.

Linn., Mant. II: 156 (1771); *Murray*, Syst. Veg. ed. XIII: 554 (1774); *Reichard*, Gen. Plant. ed. VII: 337 (1778); *Houttuyn*, Syst. Plant. IV: 238 (1779); *Reichard*, Syst. Plant. ed. Nov., III: 479 (1780); *Lamarck*, Enc. Méth. Bot. 1, 2: 435 (1783) (as part of *Borbonia*); *Murray*, Syst. Veg. ed. XVI: 665 (1784); *Jussieu*, Gen. Plant.: 535 (1789); *Necker*, El. Bot. III: 29 (1790); *Schreber*, Gen. Plant. ed. VIII, II: 499 (1791); *Gmelin*, Syst. Nat. ed. XIII, II: 1113 (1791); *Giseke*, Praelect.: 415, 427 (1792); *Persoon*, Syst. Veg. ed. XV: 703 (1797); *Ventenat*, Tabl. Reg. Veg. III: 386 (1799); *Andr.* Bot. Rep.: t. 568 (1799-1811); *Willdenow*, Spec. Plant. ed. IV, III, 2: 114 (1800); *Moench*, Méth. Plant. suppl.: 52 (1802); *St. Hil.* Exp. Fam., II: 213 (1805); *Persoon*, Syn. Plant. II: 309 (1807); *Sims* in Curt. Bot. Mag. XXXI: t. 1241 (1810); *Ait.* Hort. Kew. IV: 317 (1812); *Sprengel*, Anleit. ed. II, II, 2: 754 (1818); *H. G. Bromm*, De Form. Pl. Leg.: 132 (1822); *Thunberg*, Flora Cap. II: 565 (1823); *De Cand.*, Prodr. II: 121 (1825); *La marck & Mirbel*, Hist. Nat. Veg. III: 266 (1826); *Reich.* Consp. Reg. Veg.: 153 (1828); *Sprengel*, Gen. Plant. ed. Nona, I: 590 (1830); *Bartling*, Ord. Nat. Plant.: 409 (1830); *G. Don*, Gen. Hist. II: 131 (1832); *E. Spach*, Hist. Nat. Veg. Phan. I: 191 (1834); *Meisn.*, Plant. Vasc. Gen.: 60 and 85 (included in a key) (1837); *Endlicher*, Gen. Plant.: 1261 (1840); *Reich.*, Nomenclator: 151 (1841); *Endlicher*, Ench. Bot.: 667 (1841); *Brongn.*, En. Gen. Plant.: 127 (1843); *Benth.* in Lond. Journ. Bot. II: 442 (1843); *Hook.* in Curt. Bot. Mag.: t. 4034 (1843); *Lindley*, The Veg. Kingd.: 553 (1846); *Harvey & Sonder*, Flora Cap. II: 14 (1861-62); *Benth. & Hook.* Gen. Plant. I: 472 (1862); *Taubert* in Engl. & Prantl, Nat. Pfl. Fam., III-3: 215 (1894); *Adamson & Salter*, Flora Cape Pen.: 460 (1950); *Phillips*, Gen. S.A. Fl. Pl., ed. 2: 401 (1951); *Hutchinson*, Gen. Fl. Pl. I: 347 (1964).

DESCRIPTION

Shrubs of varying habit, low and more or less prostrate, or erect and up to 2.50 m tall. *Branches* weak or stout, smooth though usually with numerous prominent cicatrices of fallen leaves and with more or less decurrent ridges; yellow-brown in colour but turning silvery grey with age, glabrous to hairy, often with a tuft of more or less persistent hairs in the axils of the leaves. *Stipules* if present, extremely small. *Leaves* simple, sessile, straight, slightly spreading and pointing upwards or deflexed, rigidly coriaceous, usually with a pungent mucron, acuminate, ovate to obovate or elliptic, or oblong, commonly glabrous, sometimes hairy. Various sizes (dwarfed leaves occur regularly, often directly below the inflorescence), glaucous to dark green, often slightly waxy or pruinulose, the main veins (3-7) and the often more or less cartilaginous edges yellow, the mucron often brown. *Inflorescence* terminal, solitary, paired or few clustered

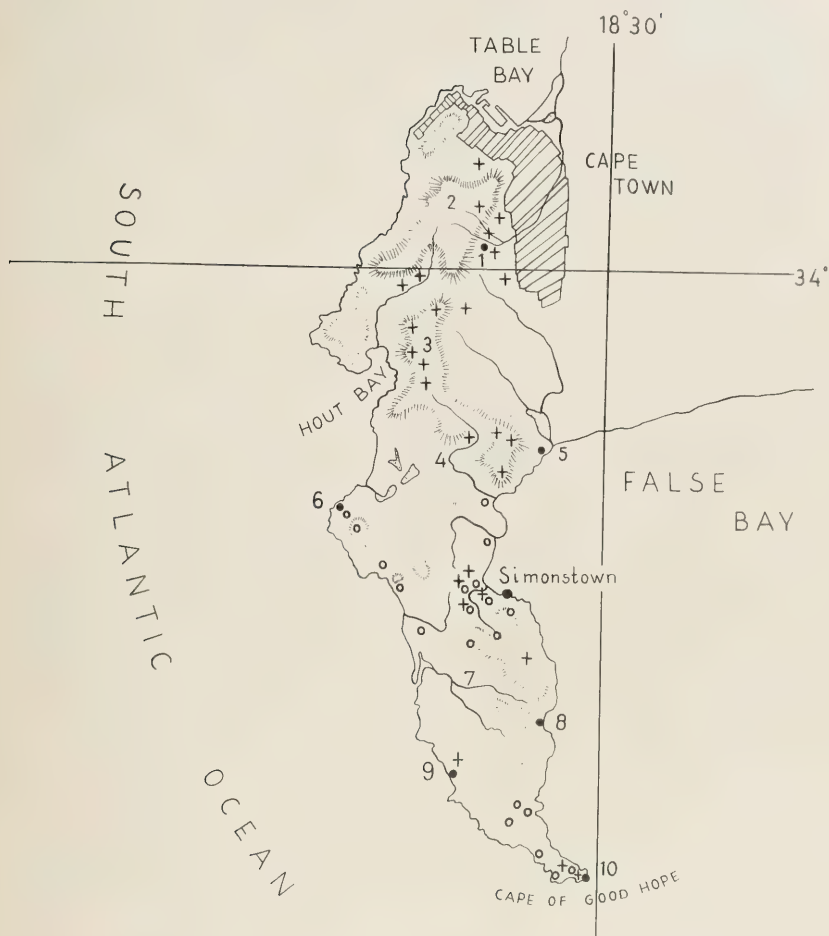


FIG. 1.

Distribution of *Liparia*. 1. Kirstenbosch; 2. Table Mountain; 3. Constantiaberg; 4. Silvermine River; 5. Muizenberg; 6. Kommetjie; 7. Klaasjagers River; 8. Smitswinkel Bay; 9. Bright-water; 10. Cape Point. + *Liparia splendens* subsp. *splendens*; o *Liparia parva*.

together on short lateral branches at the end of the branch, or $\pm$ sessile; usually nodding, occasionally erect, consisting of many flowers in a contracted, bracteate raceme, with the appearance of an involucreted head. Each bract, except those on the outside of the inflorescence, subtending a flower. *Peduncle and pedicels*, short and hairy, the former with the last few mm entirely barren. *Bracts* large and conspicuous, the outer suborbiculate or broadly ovate-acuminate, the inner ones usually narrower and slightly longer than the outer; tips rounded or tapering to apiculate. The bracts appear petaloid, pale green to pale yellow at first, often partly turning reddish, sometimes dark maroon; surface usually glabrous, but sometimes variously hairy; edges glabrous to densely ciliate. *Calyx* 5-lobed, with a short tube, the base becomes strongly intruse in anthesis. Uppermost lobes cleft, narrowly triangular, the laterals often deeper cleft, the anterior lobe very different, much larger and usually more than twice as long as the other lobes and much wider, obovate and boatshaped, entire or more or less dentate at the tip. Lobes glabrous or variously hairy, the anterior lobe usually less hairy than the others. Calyx usually pale yellow, the largest lobe resembling the bracts. *Corolla* papilionaceous, the petals almost equal in length, and about equalling or much exceeding the anterior calyx lobe, glabrous, pale to orange yellow, sometimes with some red colouring. *Vexillum* $\pm$ ovate, with two successive perpendicular bends in the narrow basal part. Above the second of these straightening, more or less plicate along the midrib, and with the lateral margins strongly reflexed-inrolled on the back, either with the central field remaining partly expanded or entirely inrolled and leaving hardly any expanded central part; sometimes the lateral margins lobed in the upper part. *Alae* clawed (claw spirally twisted), limb oblong $\pm$ rectangular to obliquely cuneate; usually tightly wrapped round the carina, and often surrounding each other, enveloping the carina in various ways by their more or less lobular lower margins. *Carina* usually hidden within alae and lower calyx-lobe, narrow, straight to falcate, curved near the middle, consisting of two petals, which are free, and somewhat twisted at their narrow base and usually lower margins connate in the upper half; upper margins free and closely adnate, or partly connate but always free at base and in a few apical mm. All 5 petals inserted on a slightly raised base, which is adnate to both the receptacle and the staminal sheath, and may produce nectar. Stamens and pistil enclosed within the carina. *Stamens* 10, glabrous, diadelphous, the vexillar stamen free, the other 9 connate in a dorsally open tube. Tube short, soon disintegrating by gradually splitting off the marginal filaments till the last 3; ventral stamens free at about half their length. Usually filaments and anthers dimorphous, i.e. alternately longer filaments carrying shorter anthers (including the vexillar stamen), and slightly shorter filaments carrying slightly longer anthers. Anthers versatile. *Ovary*

almost sessile, densely appressed hairy outside and gradually narrowing to a more or less curved style, which becomes glabrous at about the same height where the staminal sheath ends, gradually tapering to the minute, hairy, obliquely capitate stigma; ovules up to 8, pendulous, of which usually only a few develop into seeds. *Pods* flat, oblique, continuous, hairy, style remnant usually persisting, opening by two valves, twisting. *Seeds* bean-shaped with a brown leathery skin, albuminous, on a stout funicle, the hilum surrounded by a collar-like strophiolus.

TYPE SPECIES. *Liparia sphaerica* L. (= *L. splendens* (Burm. f.) J. J. Bos et de Wit).

DISTRIBUTION AND ECOLOGY

SOUTH AFRICA: S.W. Cape Province, west of Mosselbaai and south of Paarl; endemic. (Fig. 1, 2).

ECOLOGY. *Liparia* L. belongs in the "Cape fynbosch", usually growing in rocky or stony localities, on mountain slopes and flats, from sea-level to 1,200 m alt.; in small groups of few to fairly many individuals, often sprouting from subterranean radiating stems. The shrubs occur in rather restricted areas, apparently not much propagating by means of seedlings, since these appear to be very rare and were never noticed by me in the field; neither did I find any young plants on the localities I visited.

Although *Liparia* was cultivated in several conservatories in the last centuries (especially in England) and the older garden manuals describe it as fairly easy to raise from seeds and cuttings, it certainly is rare in living plant collections nowadays, even in its country of origin, and seeds do not readily germinate without special treatment. However, if the testa is slightly damaged, by scraping or filing, some seeds will germinate readily, while I found that untreated seeds did not germinate at all. Of further treatment we have as yet no experience but it should be noted that the older literature warns against direct watering on the foliage, which "is certain to kill" the plants after some time (*G. Don*, Gen. Hist. II, p. 133. 1832).

KEY TO THE SPECIES AND SUBSPECIES

1. Shrubs, usually erect, occasionally more or less prostrate, up to 2.50 m high. Lateral calyx-lobes usually equalling or slightly exceeding the upper pair. Corolla bright- to orange-yellow, usually with red markings on the alae. Vexillum 2—4 cm long, expanded part between the revolute margins at least 8 mm wide *L. splendens*
 - Edges of the flower-bearing bracts and lower calyx-lobes glabrous, or partly ciliate, but at least more than half of their total circumference glabrous subsp. *splendens*
 - Edges of the flower-bearing bracts and lower calyx-lobes ciliate, or partly so, but at least more than half of their total circumference hairy subsp. *comantha*

2. Subshrubs, more or less prostrate, up to 30 cm high. Lateral calyx-lobes usually shorter than the upper pair. Corolla greenish to pale yellow, lacking red markings. Vexillum up to 2 cm long, up to 4 mm across, its margins strongly revolute *L. parva*

***Liparia splendens* (Burm. f.) J. J. Bos et de Wit, comb. nov.**

TYPE. Holotype not traceable; neotype Bos 1 (WAG) + duplicates. Homotypic synonym: *Leucadendron splendens* Burm. f. (N. L. Burmann) Prodr. Fl. Cap.: 4 (1768); DC. Mém. Leg.: 191–192 (1825) (*in synonym*); Thistleton-Dyer, Fl. Cap., vol. V-1: 552 (1911) (imperf. known spec.); DC. Prodr. II: 121 (1825) (*in synonym*).

Heterotypic synonyms. *Liparia sphaerica* L., Mant. II: 268 (1771); Murray, Syst. Veg. ed. XIII: 554 (1774); id., Syst. Veg. ed. XIV: 665 (1784); Persoon, Syst. Veg. ed. XV: 703 (1797); Sprengel, Syst. Veg. ed. XVI: 271 (1826); Reichard, Syst. Plant. ed. Nov. III: 479 (1780); Houttuyn, Syst. Plant. IV: 238 (1779); Gmelin, Syst. Nat. ed. XIII. II: 1113 (1791); Willdenow, Spec. Plant. ed. IV. 1800, III-2: 1114 (1800); Thunberg, Prodr. Pl. Cap.: 123–124 (1794–1800); Andr., Bot. Rep.: t. 568 + Fig. (1799–1811); Persoon, Ench. Syn. Plant.: 309 (1807); St. Hil., Exp. Fam. II: 213 (1805); Sims in Curtis's Bot. Mag. 31: t. 1241 + Fig. (1810); Bronn, Form. Plant. Leg.: 60 (1811); Link, Enum. alt. II: 240 (1822); Thunberg Fl. Cap. II: 565 (1823); Lodd., Bot. Cab. 7, t. 642 + Fig. (1818–1824); DC. l.c.; G. Don, Gen. Hist. 1832, II: 131 (1832); E. Spach, Hist. Nat. Veg. Phan. I: 191 (1834); Ecklon & Zeyher, En.: 164 n. 1215 (1836); E. Meyer, Comment. Dr.: 17 (1835); Walp. in Linnaea XIII: 468 (1839); Walp. Rep. I: 580 (1842); Meisn. in Lond. Journ. Bot. II: 63 (1843); Benth. in Lond. Journ. Bot. II: 443 (1843); Harvey & Sonder, Fl. Cap. II: 14 (1861–62); Taubert in Engl. & Prantl. Nat. Pfl. Fam. III-3: 215 (1894); Adams & Salter, Fl. Cap. Pen.: 640 (1950). Homotypic synonyms *Borbonia sphaerica* (L) Lmk, Enc. Méth. Bot. 1 (2): 437 (1738).

Subsp. *splendens*

Shrubs between 30 cm to 2.50 m high; stems stout, usually glabrous, but sparse long, weak, simple hairs may occur, especially directly below the inflorescence. Tufts of white to rusty coloured hairs may persist for some time in the leaf-axils. Stipules rarely quite absent, sometimes up to $\frac{1}{2}$ cm long. *Leaves* very variable, between ($2\frac{1}{2}$ —) $3\frac{1}{2}$ — $5\frac{1}{2}$ ($—6\frac{1}{2}$) cm long and —17 (5—27) mm wide; mucronate tip pungent and almost spiny, or sometimes callous and blunt; directed upwards to densely imbricate at the ends of the branches, entirely glabrous (except the leaf directly below the inflorescence which may be more or less ciliate on the edges). Foliage leaves mostly become dwarfed (7 mm long, 3 mm wide and less), as transitions to the bracts, and these often show a rather dense ciliation on the edges. They (and some larger leaves directly below them)

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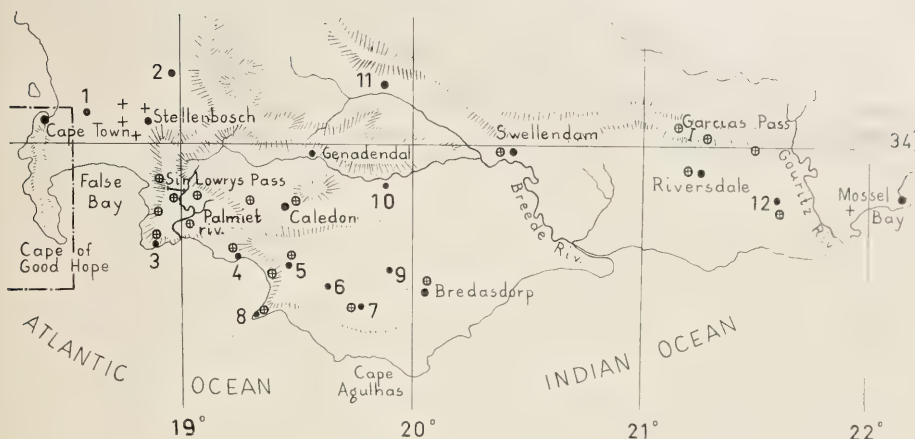


FIG. 2.

Distribution of *Liparia splendens*. 1. Bellville; 2. Paarl; 3. Betty's Bay; 4. Hermanus; 5. Stanford; 6. Paviesvlei; 7. Elim; 8. Danger Point; 9. Napier; 10. River Zonder End; 11. Robertson; 12. Albertinia. + *Liparia splendens* subsp. *splendens*; + *Liparia splendens* subsp. *comantha*.

may bear some hairs on the upper surface, spreading from profuse axillary tufts. *Inflorescence* mostly solitary, terminal, nodding, (3½—) 4—7 (—8) cm long and (4—) 5—8½ (—10) cm wide. Pedicels about 4 mm long. *Bracts* usually shorter than the leaves (2—) 2½—3½ (—4½) cm long and (3—) 5—20 (—23) mm wide, the inner bracts usually narrower, the outer usually 15 mm wide. Lowermost bracts often comparatively small, resembling the uppermost leaves in being slightly hairy on the upper surface due to profuse axillary hair, and densely ciliate on the edges. The lower surface is always glabrous. The main body of bracts is entirely glabrous, but the edges may be slightly ciliate near the base in the better part of the bracts, while intermediary forms may show interrupted or lax fringes on all bracts. The margins are entire, very rarely laterally irregularly lobed or with a three-dentate tip. In the inner lobes sometimes long drawn out tips may occur. *Calyx* (1½—) 2½—3½ cm long or slightly longer, the tube (3½—) 4—6 (—7) mm long, (4—) 5—6 (—8) mm wide, glabrous or slightly hairy outside (if hairy then usually in strands below the incisions between the lobes). Upper lobes small, narrow, apiculate or mucronate (5—) 8—11 (—15) mm long and (2—) 3— (—5) mm wide at base, connate in the lower part up to ½ their length, glabrous (or occasionally sparsely hairy), margins below usually barbato-ciliate by short woolly hairs, the free part of the upper margins ciliate,

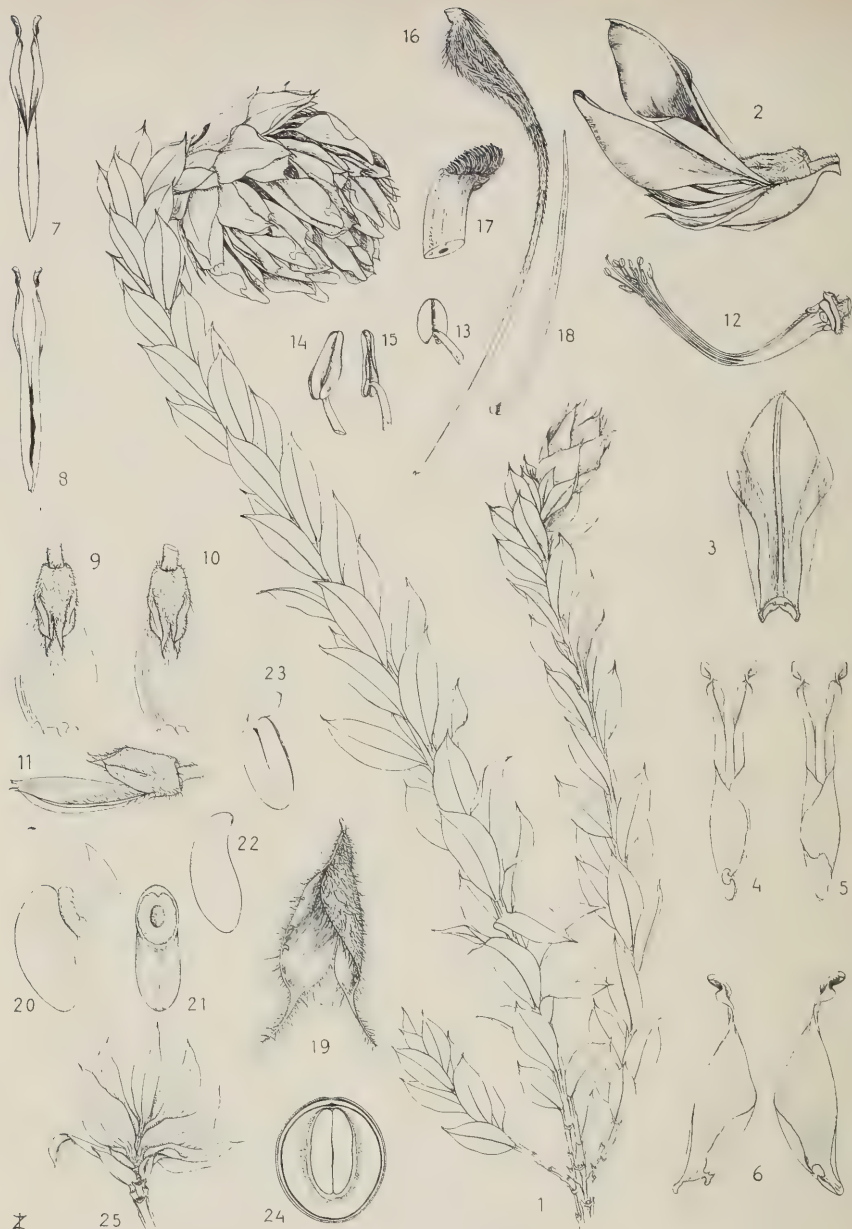


FIG. 3.

Liparia splendens subsp. *splendens* 1. flowering branch ($\times \frac{1}{4}$); 2. flower and bract; 3. vexillum (adaxial); 4, 5. alae (from below); 6. alae (opened, inner surface); 7. carina (from below); 8. carina (above); 9, 10. calyx (upper view); 11. calyx (laterally); 12. staminal tube (calyx partly removed); 13. small anther, still closed ($\times 5$); 14. large anther, laterally, open ($\times 5$); 15. large anther, posteriorly, open ($\times 5$); 16. pistil ($\times 2$); 17. stigma ($\times 20$); 18. hair of ovary ($\times 40$); 19. pod; 20. seed laterally ($\times 3$); 21. seed ventrally ($\times 3$); 22. endosperm, testa removed ($\times 3$); 23. embryo ($\times 3$); 24. transverse section of seed ($\times 9$); 25. top of branch with bracts, flowers removed ($\times \frac{1}{4}$). 1-18, 25: Bos 1, neotype (WAG); 19: Bos, Oranje Kloof (WAG); 20-24: Rycroft 446, Oranje Kloof (WAG), seeds only.

or glabrous though apparently ciliate because of the densely villous inner surface. Always glabrous in the connate part inside and sometimes glabrescent towards the tip. Lateral lobes usually subfalcate, about equalling the upper lobes, similarly hairy, though less often ciliate on the upper edges, and on the inner surface from the base upwards villous but often glabrescent or glabrous apically. Lower lobe usually (4—) 3 dentate, the tip blunt, and occasionally apiculate (the midrib terminated by a short mucron) (15—) 20—30 (—33) mm long and (6—) 9—15 (—18) mm wide, usually glabrous outside though some lax hairs may occur in the lower third; on the inner surface a triangular villous patch at the base of the lobe, up to $\frac{1}{2}$ or $\frac{3}{4}$ of its length, rarely longer but then the patch puberulous and only villous along its margin, edges usually glabrous, occasionally the margins in the lower part may be more or less hairy. Intermediary specimens may show some lobes with sparsely ciliate edges. *Corolla* from about equal to twice as long as the larger calyx-lobe, of a bright warm to orange-yellow colour often with some red on the wings, vexillum and tip of the carina. *Vexillum* partly expanded and slightly plicate along the midrib above the two sharp bends near its base; margins laterally strongly revolute in anthesis and inrolled at the back (in young flowers the vexillum may be entirely expanded); margins entire or the revolute part crowned by a shallow lobe (rarely bilobular), usually about 1 cm from the tip. The top part of the vexillum above these lobes (or revolute parts) slightly incurved to shallowly cucullate (the apiculate tip of the midrib pointing forwards), 4—3 cm long, 15—23 mm wide, while the expanded part, between the revolute margins is (8—) 10—15 mm wide. In flower the vexillum usually stands well apart from the other petals, but in bud it encloses the others entirely. *Alae* equalling the vexillum or almost so, claw $\pm$ 7 mm long, 3 mm wide, twice twisted in opposite directions, then the limb gradually widening and becoming obliquely wedge-shaped (upper margin straight), 8—11 mm wide at $\frac{2}{3}$ to $\frac{3}{4}$ of its total length; from this point the lower margin reaches the upper by forming two distinct lobes (often with a tiny third and rarely a 4th lobule between them). The margins lock round the carina by means of these lobes, either by alternately folding one lobe over the other or with the small lobules twisting around each other, thus somewhat resembling a bowtie (see Fig. 3 (4—6)). Petals of the *carina* more or less twisted like the alae in the narrow free base, equalling the alae in length, with a shallow upward bend at about $\frac{1}{3}$ of its length, the upper half being straight, widest about the middle (3—5 mm), upper margins free or partly connate from here till about $\frac{3}{4}$ of the length, the narrow tip of the carina rounded, sometimes slightly reddish, otherwise paler yellow than the other petals or similar. *Stamens* of the longer kind about 35—40 mm long, anther about 1 mm long; the stamens with shorter filaments carry $1\frac{1}{2}$ —2 mm long anthers; connate part 15—17 mm

long. *Pistil* slightly longer than the stamens. *Ovary* short stalked (± 1 mm), 7—8 mm long, densely appressedly hairy (hairs simple, bulbous-based, up to 3 mm long), style slightly stouter than the filaments, becoming glabrous at or slightly above the end of the staminal sheath, stigma fringed by minute, curved, papillate hairs. *Pod* 2—3½ cm long (mucron (style remnant) 3—5 mm), ± 1 cm wide. Of 6—8 ovules, 0—5 develop. Seeds 5—6 mm long, 2—4 mm wide, pendulous from a stout 1—2 mm long laterally compressed funicle, having an ariloid or strophiolate collar round its top, which becomes fully detached from both the funicle and the hilum, and leaves the micropyle exposed. Germ and cotyledons entirely surrounded by endosperm, which is differentiated into three distinct layers, the outermost white, the central cloudy-hyaline, and the inner touching the radicle and the cotyledons, translucent. The cotyledons show a shallow median furrow on the outside, the straight radicle points obliquely upwards, its tip close to the micropyle. Cotyledons of the seedling entirely glabrous.

DISTRIBUTION: At all altitudes below 1,000 m on the Cape Peninsula and Cape Flats, generally south of the Paarl and west of the Hottentots Holland mountains. One locality in the Mossel Bay district (Vreyersberg), forming the easternmost limit of the genus. (Fig. 1, 2.)

ECOLOGY. The shrubs mostly grow on rocky mountain slopes, sometimes near a small stream or in somewhat moist places, but also on “klipkoppies”, usually rooting in heavily rock-infested soil of granitic or Table-Mountain sandstone origin.

The plants seem to be able to produce flowers in every month of the year, judging from the collecting dates. May to November is the best period for flowering. On the southern peninsula no flowers were collected in July and August. Repeatedly seed collections were sown in the conservatory at Wagenin-gen without any indication of germinating. Numerous seeds were found to swell readily, but very few actually did germinate. In spite of all care and efforts no seedlings established themselves, growth was discontinued and the plantlets withered after producing healthy looking cotyledons on a short hypocotyledonous stem.

TYPIFICATION. The only specimen of *Leucadendron splendens* Burm. f. preserved in the Burmann Herbarium was remounted at an unknown date and is of unknown origin. It may have been added to the Burmann Herbarium after completion of the Prod. Fl. Cap. Moreover, the specimen is badly damaged and the inflorescence has disappeared. Specimens from the Burmann Herbarium are known to be preserved at LINN and at M. Among those no trace of *Leucadendron splendens* (or *Liparia sphaerica*) was found. A neotype is now designated, since any material that the author might have studied cannot be traced. As regards the typification of *Liparia sphaerica* L., a similar uncertainty exists.

Of the two sheets in the Linnean Herbarium, labelled as *L. sphaerica* by Linnaeus the younger, one was collected by Sparmann (no. 133), and thus cannot have reached Linnaeus before 1772, i.e. after the publication of *Mantissa altera* (1771). The other specimen is of unknown origin, and since it lacks any handwriting of Linnaeus cannot be accepted as the holotype. The practice of Linnaeus of giving away (type—) specimens when he received a "better" specimen of the same species or for other reasons, is well known.

POLLINATION. Scott Elliot (in *Ann. Bot.* 5: 543 (1890-91)) reported that cross-fertilisation by large insects standing on the vexillum of the flower while harvesting honey will be more effective than when the insect alights on the wings; he has not seen the insects actually pollinating, but suspects carpenter bees (*Xylocopa*). Marloth (*Fl. S. Afr.* 2: 72 etc. (1925)) mentions that he has observed sunbirds (*Anthobaphes violacea*) and carpenter bees (*Xylocopa capensis*) visiting the flowers for their honey. Vogel summarises these findings (*Bot. Stud.* Heft 1: 211 (1954)), gives an extensive description of the flower, and deduces that pollination will take place according to the pumping principle, whereby the honey-sucking bird by pressing its head or bill into the flower between the vexillum on one side and the other petals on the other side, presses or pumps the pollen on top of the style out of the tip of the carina. The pollen and stigma so come into contact with the throat feathers of the bird and cross pollination may follow.

SPECIMENS EXAMINED

(Specimens marked * were sent to me on loan)

CAPE PROVINCE. Hills near Cape Point, *Schmidt* 349 (M*). Brightwater, *Leighton* 1617 (BOL). Millers Point, *Marloth* s.n. (PRE). Simonsbay, *Alexander* 23 (K*), *Dümmer* 79D (E*), ?*Wright* 550 (TCD*, K*). Red Hill, *Jameson* s.n. (K*), *Rogers* s.n. (PRE), *Bos* 330 (WAG*). S. Penins: ?*Hesters dam*, *Galpin* 12776 (PRE), *Salter* 2087 (BM*). Silvermyn, *Werdemann & Oberdieck* 76 (B*), *Anon.* 35 (S*). Kalk Bay-Muizenberg, *Andreae* 122 (PRE), *Barker* 4206 (NBG*), *Barnard* s.n. (SAM*), *H. Bolus* 2975 (NY*, BOL, PRE), *Harvey* s.n. (BM*), *Hickson* s.n. (SAM*), *Marloth* 6363 (PRE), *Meebold* 13315 (M*), *Moss* 4262 (BM*), *Alexander Prior* s.n. (K*, PRE), *Thode* s.n. (STE), *Wall* 564/54 182 (LD*), *Anon.* s.n. (TCD*). Steenberg, *Dümmer* 1154 (E*), *Ecklon* s.n. (P*), *Pillans* s.n. (PRE). Constantiaberg, *Compton* 12542 (NBG*), 20233 (NBG*), ?*McOwan* s.n. (E*), *Wolley Dod* 2153 (K*, BOL). Houtbaai: Skoorsteenkop. *Acocks* 689 (PRE), 2319 (S*). Tierbos, *Acocks* s.n. (S*). Constantia, *Krauss* s.n. (M*, WRSL*), *Pappe* s.n. (K*), *Pillans* 10657 (MP*, NY*), *Salter* 9462 (BM*), *Wallich* 129 (TCD*, BM*, PRE). Oranje Kloof, *Schelpke* 3896 (BM*), *Bos* 681 (WAG*). Cape Flats between Cape Town and Simons Bay, *Burchell*

8585 (S*, P*, GOET*, PRE, K*, L*, NY*, M*). Wynberg, Drège ?473 (P*, BM*). Table Mt. *H. Bolus* 2975 (BM*), *J. Bolus* 1621 (PRE), *Ecklon & Zeyher* 1215 (SAM*, M*, S*), *Kassers* 118 (HBG*), *Krauss* 937 (NY*), *McOwan* 1423 (SAM*, UPS*, STE), 2313 (SAM*), *Marloth* 7 (PRE), *E. Meyer* s.n. (S*), *Rehmann* 848 (BM*), *Werdemann & Oberdieck* 76 (PRE), *Anon.* s.n. (NBG*), ib. pone Constantiam, *Anon.* 54 (TCD*). Kirstenbosch (above Window creek), *Barker* 326 (NBG*), *Esterhuyzen* 221 (NBG*), 17334 (BOL, PRE), *Bos* 680 (WAG*), ib. Mnts. above, *Hutchinson* 54 (K*), ib. Trolley track, *Compton* 10320 (NBG*). Cape Town, *Harvey* ?550 (TCD*), *Hesse* s.n. (GOET*). Cape Peninsula, *Phillips* s.n. (SAM*), *Thunberg* s.n. (S*), Herb. Vocke ?6463 (GOET*, "*Leucadendron splendens*"), *Wood* 1605 (ex herb. Ch. d'Alleizette, L*). Brackenfell, *Bos* 411, 412 (WAG*), *Bos* 1 (neotype, WAG* + dupl.). Kuilsrivier, *Bosman* s.n. (BOL). Bot-lercy, *Bosman* ?557 (STE). Vlotenburg, *Duthie* 557a (STE*, intermediary). Stellenbosch, *Duthie* 557 (BOL*). Mossel Bay, *Muir* 2055 (BOL*, PRE*). Spec. ex Hort.: Kirstenbosch, *Henderson* 1044 (PRE), *Schmidt* 349 (M*). Stellenbosch, *Krige* s.n. (intermediary, BOL*). Hort. Tolos.: Herb. *Moquin-Tandon* s.n. (P*). Hort. Cavanilles, Herb. *Buckley* s.n. (MO*). Hort. ?Leiden: Herb. *Persoon* s.n. (L*).

UNCERTAIN LOCALITY. Stellenbosch-Vlakkenberg, *Marloth* 7476 (PRE*). Nursery ravine, *Marloth* 11985 (PRE). Constantia, bought at the door, *Arbutnot* s.n. (STE). Wild Flower show Stellenbosch 1961, *Kirstenbosch* 658 (PRE, STE).

CAPE OF GOOD HOPE. *W. Brown* s.n. (E*), Herb. *Al. de Bunge* s.n. (P*), ?*De Candolle* s.n. (P*), Drège ?473 (K*, PRE, P*), ?*Ecklon & Zeyher* ?1215 (FI*), *Gueinzus* s.n. (S*), *Harvey* 766 (E*), 6463 (E*), *Lehmann* s.n. (P*), *Niven* s.n. (BM*), *Cole* s.n. (ex. herb. *Mackay*, TCD*), ?*Poeme* s.n. (L*), *Preisiz* s.n. (UPS*), Herb. *Retzius* s.n. (LD*), *Reynaud* s.n. (ex. herb. *Jussieu*, P*), *Roxburgh* s.n. (BM*), *Sieber* 151 (BM*), *Thunberg* s.n. (S*), Herb. *Wendland* s.n. (GOET*), *Anon.* s.n. (P*), Herb. *Barnardi* s.n. (MO*), Herb. *Henschel* 457 (WRSL*), Herb. *Splitgerber* s.n. (L*).

SOUTH AFRICA. *Ecklon & Zeyher* s.n. (LD*), *Scott Elliot* s.n. (ex. herb. *Scully*, E*).

NO LOCALITY. *Forbes* 261 (BM*), s.n. (K*), Herb. *Reinwardt* s.n. (L*), *Dahl & Thunberg* s.n. (S*), *D. Thunberg* s.n. (S*), *Anon.* s.n. (S*), Herb. *Henschel* s.n. (WRSL*), *Anon.* s.n. (LINN), *Sparmann* 133 (LINN), *de Monchy* s.n. (G-DC), *Lambert* s.n. (G-DC), *Thunberg* herbarium (UPS, 2 sheets). Subsp. *comantha* (Eckl. & Zeyh.) J. J. Bos et De Wit, comb. et stat. nov.

TYPE. *Ecklon et Zeyher* 1216, "Hottentotshollandskloof" prope "Palmiet-rivier" (Stellenbosch), lectotype, P; ?isotypes at M, LD (2 sheets), K.

Homotypic synonyms. *Liparia comantha* Eckl. & Zeyh., En.: 164, n. 1216

(1836); Walpers in *Linnaea* XIII: 468 (1839); Walp. Rep. I: 580 (1842); Benth. in *Lond. Journ. Bot.* II: 443 (1843); Harvey & Sonder *Fl. Cap.* II: 15 (1861–62).

HETEROTYPIC SYNONYMS. *Liparia burchellii* Benth. in *Lond. Journ. Bot.* II: 443 (1843). Harvey & Sonder *Fl. Cap.* II: 15 (1861–62).

TYPE. Burchell 6881 K (holotype), GOET, L, M, P, (isotypes). *Liparia parva* Vog. ex. Walp. var. *angustifolia* Benth. ex. Hook. in *Curtis's Bot. Mag.*: t. 4034 + Fig. (1843). Type. ?Benth. s.n. Culta K (holotype).

Shrub usually 30–90 cm high, occasionally not erect but more or less prostrate and decumbent (north of Sir Lowry's Pass, Hott. Holland mnts.). *Branches* glabrous to sparsely pilose, young parts often hairy, soon glabrescent, few hairs persistent below the inflorescence. Stipules usually present, rarely up to 3 mm. *Leaves* variable, 2–5 cm long, 5–15 (–20) mm wide. Dwarfed leaves less than $\frac{1}{2}$ cm long occur rather frequently. Mucronate tip straight, sometimes hooked, usually glabrous, some solitary hairs may be present, edges occasionally minutely scabridly toothed, sometimes fringed with long weak hairs, especially when young, and often directly below the inflorescence. *Inflorescence* terminal, single or few clustered together on short lateral branches or almost sessile, usually nodding, but occasionally more or less erect ($2\frac{1}{2}$ –) 3–6 cm long and (3–) 4–7 cm wide. Pedicels 2–4 mm long. *Bracts* usually shorter than the leaves but as wide: (9–) 15–30 (–35) mm long and (3–) 5–16 (–20) mm wide. They are glabrous on the faces, but the edges are usually ciliate with a short fringe of white or rusty coloured hairs, usually rather dense, but sometimes more laxly so, or glabrescent to glabrous edges on few bracts or partly thus; in few specimens with glabrous tips or glabrescent edges in the upper half and in one case only so in the lower half. Intermediary specimens show rather lax fringes, with extensive glabrous or glabrescent parts of the edges, but they are considered to belong to this subspecies when more than half of the edges of both bracts and larger calyx lobes are ciliate, however laxly that may be. *Calyx* 1.5–3 (–3.5) cm long, the tube 3–5 mm long and 4–6 mm wide, densely hairy outside, occasionally less hairy and subglabrous in the intermediary. The upper lobes usually connate till about $\frac{1}{3}$ or $\frac{1}{2}$ their length, (4–) 5–10 (–12) mm long, 2–4 mm wide, the lateral about similar though often slightly falcate and a little longer, rarely shorter than the upper pair (4–) 5–10 (–15) mm long and 2–3 mm wide, sparsely to densely hairy outside and densely ciliate on the margins, sometimes with stout hairs to the upper and woolly-barbate to the lower edges. The large lower lobe may be simply apiculate or more or less distinctly 2–3 dentate at the tip (even within the same inflorescence). It is (10–) 15–21 (–30) mm long and (3–) 5–10 (–15) mm wide, at or about the middle, 3 mm wide at the very base. Hairy outside but often only

sparingly so, the hairs thinning from the base upwards and becoming glabrescent to glabrous in the upper $\frac{2}{3}$ to $\frac{1}{2}$. The edges usually densely ciliate, but the fringes may dwindle in the upper part, while the intermediary forms only show dense fringes at the very base of the edges, these soon becoming glabrescent with only occasional hairs on the edges of the upper parts. The inside villous but often with a puberulous patch in a triangle from the base to the centre surrounded by the longer hairs, more rarely with a glabrous tip and glabrous margins inside. *Corolla* overtopping the larger calyx lobe slightly to up to 2 cm, usually however, about 1 cm longer. *Vexillum* (20—) 25—40 (—45) mm long, entire width between 13 and 23 mm, the expanded part between the revolute lateral margins, 8—10 mm wide at its widest part. *Alae*-claw about 4—6 mm long, the widest part of the limb 6—14 mm wide, the total length about equal to the vexillum. The top end of the lower margins rarely not clearly lobular. *Carina* about equal to alae and vexillum in length, 3—6 mm wide in the widest part. *Stamens* with anthers occasionally not clearly of two kinds. The first leaves of the seedling glabrous, but the next may have some long weak hairs. Other characters as in subsp. *splendens*.

DISTRIBUTION

Somerset-West (east of Hottentots Holland mountains), Caledon, Bredasdorp, Swellendam and Riversdale. The Aasvoelberg south of Albertinia is the easternmost locality, Genadendal and Langeberg the northern limit. Always on rocky grounds, often on mountain slopes, never in large quantities. Altitudes from sea-level to 1,200 m, usually about 500 m. (Fig. 2.).

FLOWERING PERIOD. Flowering specimens have been collected in every month of the year, excepting February; most frequently however, in the months of July through to October, far less often in June and November, and only occasionally in the other months.

ECOLOGICAL NOTE. Usually a sprouting shrub, often vigorously growing in more or less regularly burned areas (e.g. open firebelts in Forestry Reserves). Due to topping, the plants remain low in those localities, not over 1 m high, but will expand by sprouting from underground parts. On windy exposed places on top of the Hottentots Holland mountains the plants attain a more or less prostrate habit, as though seeking protection from the other vegetation and rocky outcroppings. Plants growing with other *fynbos* remnants surrounded by planted *Pinus*-forests (at Libanon and Houhoek) may attain rather large proportions, but remain open and sparingly branched. Here as well as on the exposed lower slopes close to the sea (at Betty's Bay) the foliage was observed to be more hairy than in other localities.

Seeds sown at Wageningen in the conservatory did not germinate if not specially treated; when the testa was scratched or shallowly cut into, about half

of them did germinate readily, and seedlings, if protected from snails, developed.

BIOLOGICAL NOTES. No special observation of the pollination of this subspecies is extant, but as the flowers of both subspecies are similar in structure and differ but slightly in size, most probably they are pollinated in the same way as was observed in the other subspecies, sunbirds being the agents.

Upon examining freshly picked specimens from the Sir Lowry's Pass area (Bos 1393), I noticed a sluglike insect exactly resembling the leaves of this plant. The insect so closely resembled a leaf, that some students, who were asked to indicate the animals seated on a branch held before them at a distance of less than 1 m, failed to do so; I myself only saw it when I examined the branch and was puzzled by the irregular insertion of a "leaf", which suddenly moved when being touched.

The Entomological Department at Stellenbosch University identified this as a caterpillar of unusual habit. With some difficulty a second specimen was secured from the same area, and both were cultivated by Dr. Theron. Due to easier accessibility of fresh material of *L. splendens* subsp. *splendens*, their nourishment was switched to these leaves after the initial stock of subsp. *comantha* leaves had run out. They did not show any difference in habit or behaviour after this change of diet, and proceeded to turn into the pupal stage after 2 months (the end of June). Upon hatching, the imago proved to be a moth, and at the Transvaal Museum at Pretoria, Dr. Janse identified it as *Homosusica eugrapha* Janse (*Limacodidae*), a very recently published new monotypic moth-genus (Janse, The Moths of S. Afr. VII: 90-91 (1964)).

SPECIMENS EXAMINED

(Specimens marked † are fairly glabrescent on the edge of the bract)

CAPE PROVINCE. Sir Lowry's Pass, Bos 639 (WAG*†), 1394 (WAG*), Burchell 8229 (K*), Parker 4578 (MO*, BOL), Stokoe s.n. (SAM*). Hottentots-holland near Palmietriver, Bos 1393 (WAG*), Petzer s.n. (WAG*), Ecklon & Zeyher 1216 (type material of *Liparia comantha* E. & Z., P*, L*, K*, S*, SAM*), id. Drège label (LD*, FI*, NY*, MO*, L*, PRE (3), M*, GOET*), Guthrie s.n. (BOL), Ecklon & Zeyher 56, 5 (Grietjesgat) (E*, UPS*, GOET*, LD*, BOL*, L*, TOD*), Anon. s.n. (STE). Palmietriver, Guthrie 3865 (NBG*, BOL). Kogelberg, Stokoe s.n. (SAM*). Betty's Bay, Bos 375 (WAG*), 670 (WAG*). Highlands, Bos 380 (WAG*), Stokoe s.n. (SAM*), Linley s.n. (SAM*). Houhoek Pass, Vogts 210 (WAG*). Libanon For. Res., Bos 678 (WAG*). Genadendal, Kogel ?3745 (B*, intermediary). Zwartberge (*supra thermas*). Gillet 1073 (BOL*), Zeyher 2278 (FI*, P*, SAM*). Caledon, le Roux s.n. (STE), Marloth 7090 (PRE*), Esterhuyzen 2677 (Sugarloaf, BOL*). Shaws Pass, Martin 1160 (NBG*). Hermanus, Edgar s.n. (STE*), Stokoe (herb. Marloth no. 9554) (PRE*). Klein River mnts., Stokoe 6154 (BOL), Stokoe s.n.

(SAM*). Danger point, *Leighton* 1584 (BOL). Between Stanford and Elim, *Middlemost* 2207 (NBG*). Paviesvlei, *Geyer* 1160 (BOL*). Elim, *Compton* 3451 (BOL*), *Landsberg* s.n. (SAM*). Bredasdorp: Fransche kraal, *Barker* 8495 (NBG*). Hagelkraal, *Nigrini* s.n. (NBG*). Napier, *Chait* (ex. herb. *Galpin*) 10478 (PRE*). Swellendam, *van Rensburg* 12 (NBG*), *Wurts* 214 (NBG*), 296 (NBG*, BOL*), 390 (NBG*). Riversdale: Langeberg near Corente river, *Muir* 795 (PRE), *van Breda* 1098 (PRE, K*). Garcias pass, *Galpin* 3907 (PRE*), ib. For. Res., *Bos* 700 (WAG*). Albertinia, Aasvoëlberg, *Bos* 701 (WAG*), *Burchell* 6881 (K* (type of *Liparia burchellii* Bth.), P*, M*, GOET*, L*), *Muir* 632 (SAM*, BOL*, PRE), *Smallberger* s.n. (SAM*).

UNKNOWN LOCALITY. ?*Ecklon & Zeyher* ?1215 (P*), ?*Ecklon* s.n. (Nuwekloof) (SAM*), *Marloth* 7090b (PRE*), Herb. *Vocke* (Afr. Austr.) ?6463 (GOET*). Cape Town Flower Show 1921 (Hermanus exhibit) (BOL*), ib. 1925 (BOL*), ib. 1926 (Bredasdorp exhibit) (BOL).

CULTAS Kew, ?*Bentham* s.n. (K*, type of *Liparia parva* var. *angustifolia*).

Burchell 8229 (K) has a budding flowerhead with all the bracts and upper leaves ciliate, and therefore belongs here. In herb. of the South African Museum at Kirstenbosch (SAM) I found one sheet with two collections by Stokoe (labelled with SAM-herb. nos. 55909 and 52205), both of an unusual character. SAM 55909 was collected by Stokoe in the Kleinriver mountains, east of Rocklands peak, and has remarkably wide leaves, by which it is distinguished. However, due to the rather wide variability of the leaves in *Liparia splendens*, and in the absence of any other collection, even from the same area, with similar wide leaves I prefer to refer this to subsp. *comantha*. SAM 52205, mounted on the same sheet with SAM no. 55909, consists of two fragments, one being an ovary and the other a juvenile pod still within the calyx. By their size and hairiness these fragments either belong in *L. parva* or *L. splendens* subsp. *comantha*. The absence of any data, and especially of the corolla, prevents a more certain identification of these fragments, but as the lateral calyx lobes are considerably shorter than the upper, they probably belong in *L. parva*, where this character is very common, whereas it is highly unusual in subsp. *comantha*.

The sheet in the Paris Herbarium bearing a printed label of "Ecklon & Zeyher 1215", being part of their Enumeratio, consists of a hairy (margins of the bracts fully ciliated) specimen of *L. splendens* var. *comantha* (or *L. comantha* Eckl. & Zeyher). Most likely the specimen is part of the extensive collection of duplicates of the type specimen of *L. comantha* Eckl. & Zeyh., no. 1216 of the Enumeratio.

A specimen at Kew, presumably of *Bentham*'s, which was beautifully pictured in the Botanical Magazine, t. 4034, forms the type of *Bentham*'s *L. parva* var. *angustifolia* which was placed in *Liparia parva*, mainly because of its small size

and decumbent habit. This specimen originated from a plant long cultivated in Kew Gardens, and might well have become different in habit from wild specimens. I have transferred it to subsp. *comantha* in *L. splendens*. The shape of the petals as well as their colour clearly supports this view and this also explains the narrow leaves. *L. splendens* shows widely variable, though mainly oblong leaf-shapes, whereas *L. parva* tends to smaller but ovate or suborbicular leaves. It seems unwarranted to maintain var. *angustifolia* as a distinct variety and so it is included in subsp. *comantha*.

The following specimens lack any flowering or fruiting parts and therefore remain in *L. splendens* without subspecific designation: Herb. Burmann (ex herb. Delessert, G*), Jard. Boussault 1818 (G-DC), Conradie s.n. (WAG*), Herb. Persoon s.n. (L*), herb. van Royen s.n. (L*), Wallich 766 (BM*), Anon. s.n. (S*). It is possible that the Burmann specimen is the holotype of *Liparia splendens* (see under typification of *L. splendens*), but it lacks the flower-head which was broken off at some time, and it shows a strong resemblance to the specimen in the van Royen herb. at Leyden, here cited, of which it could even be a duplicate. The van Royen specimen also lost its flower-head. The Conradie specimen possibly was collected from the same plant as my own no. 701. It certainly comes from the same small growing locality but lacks flowering parts, and thus should not be classified any further, although this particular spot has produced only subsp. *comantha*. The ciliation of the uppermost leaf of Conradie's specimen may seem to point towards subsp. *comantha*, but this occasionally is seen in subsp. *splendens* also.

Liparia parva Vog. ex. Walp. in *Linnaea* XIII: 468 (1839). Walp. *Repos.* I: 508 (1842). Benth. in *Lond. Journ. Bot.* II: 443 (1843). Hook. in *Curtis's Bot. Mag.* t. 4034 (not the Fig.) (1843). Harvey & Sonder, *Fl. Cap.* II: 15 (1861-62).

TYPE. Holotype ex. Herb. Kunth, probably destroyed in B; neotype, southwestern slopes of Klaasjagersberg, Cape Pen., *Sidey* 2142, S; (duplicates at WAG, PRE and MO).

Heterotypic synonym. *Liparia crassinervia* Meisn. in *Lond. Journ. Bot.* II: 63 (1843). Benth. in *Lond. Journ. Bot.* II: 443 (1843). Harvey & Sonder, *Fl. Cap.* II: 15 (1861-62) (as a synonym).

TYPE. *Krauss* s.n. "Uitershoek" Sept. 1838 (holotype destroyed in B?), fragmo-klepto-isotype in NY (convolute pinned to sheet with *Krauss* specimen of *Liparia splendens* subsp. *splendens*, containing few leaves, the tip of a young branchlet, 1 flower and 1 bract).

Shrublet, low and more or less prostrate, not over 30 cm high. *Branches* weak and thin, occasionally stout and suberect, often densely hairy or villous, especially when young, they may become glabrous with age, occasionally quite

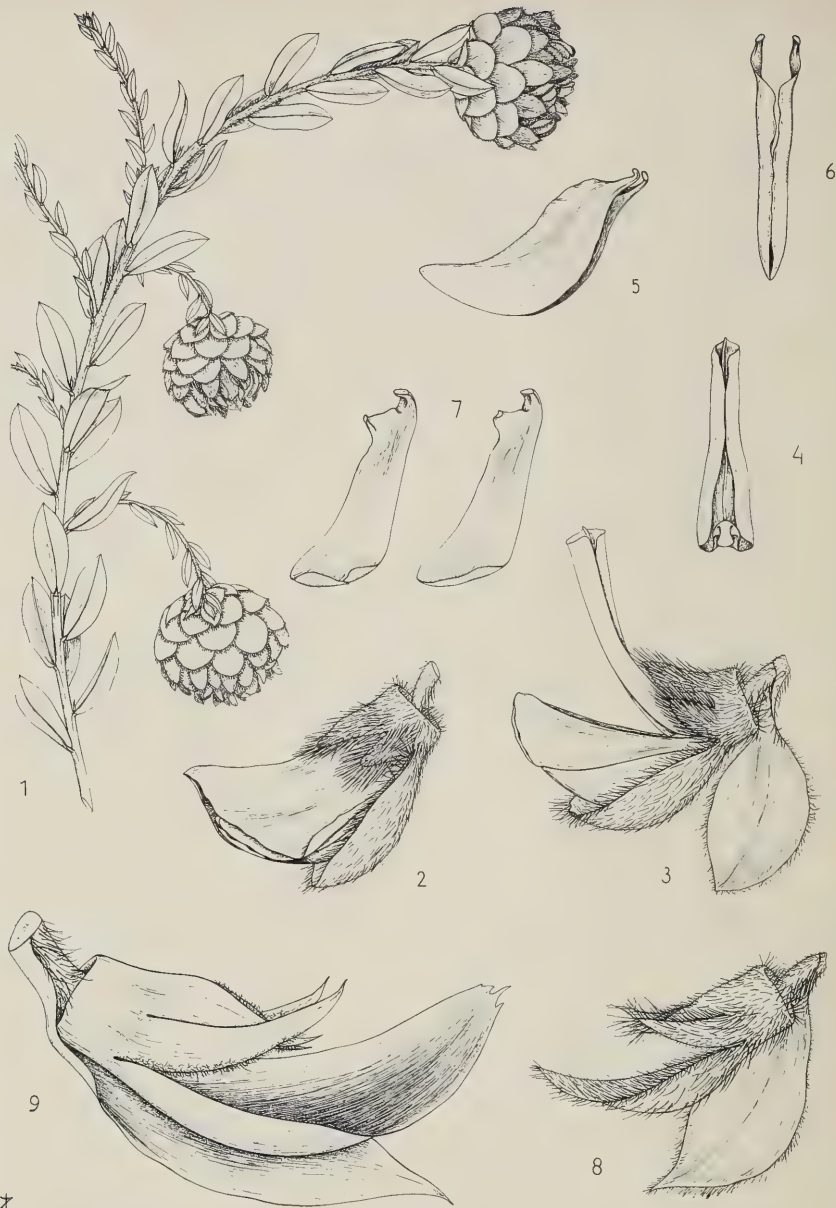


FIG. 4.

Liparia parva Vog. ex Walp. 1. flowering branch ($\times \frac{1}{2}$); 2, 3. flower ($\times 2$); 4. vexillum, adaxially ($\times 2$); 5. carina, laterally ($\times 2$); 6. carina, upper view ($\times 2$); 7. alae, inner side ($\times 2$). 1-7: J. Sidey 2142, neotype (S). *L. splendens* subsp. *comantha* (Eckl. et Zeyh.) J. J. Bos et De Wit. 8: calyx and bract ($\times 2$). J. J. Bos 1392 (WAG). *L. splendens* subsp. *splendens*. 9. calyx and bract ($\times 2$). J. J. Bos 681 (WAG).

glabrous even when young. Leaf axils usually glabrous, but small tufts of hair may be present. Stipules up to 1 mm long and occasionally spreading. *Leaves* usually small, but stouter and larger leaves are also present on some shoots, (10—) 15—30 (—35) mm long and (3—) 5—10 (—15) mm wide. Although usually spreading and pointing upwards, they sometimes may be rather distant, spreading in a horizontal plane or even strongly deflexed. Not always mucronate. Usually perfectly glabrous on the faces and often on the edges, that may be slightly scabrid, but young leaves may be hairy and remain so for some time, generally showing a tendency to remain hairy longer on the lower faces and the edges, while the upper face most often remains glabrous. They do not show more than 5 major veins, often only 3. *Inflorescence* terminal, when young shoots branch off and develop directly below it, it may look deceptively lateral. Usually nodding and hiding its flowers close to the ground, occasionally more or less upright. They are $2\frac{1}{2}$ —4 cm long and 3—5 cm wide. *Bracts* conspicuous, at first usually pale green but soon turning, often to dark, maroon red in anthesis. The ones on the outside often suborbiculate and bluntly rounded without an apiculate tip to clearly apiculate, or narrower and more ovate, (10—) 15—20 (—21) mm long and 5—15 mm wide. Usually glabrous on the faces, but sometimes more or less hairy on the lower (=outside) face, especially at the base and along the centre. The edges are densely ciliate or only slightly fringed or even quite glabrous, sometimes only partly ciliate with glabrous tips or with few scattered hairs on the edges. *Calyx* $1\frac{1}{2}$ —2 cm long, the tube 1—3 mm long and up to 5 mm wide, densely villous to sparsely hairy outside. The upper lobes are 6—8 mm long, about 2 mm wide, and connate up to $\frac{1}{3}$ to slightly above $\frac{1}{2}$ their length. They are villous outside, densely ciliate on the edges, inside densely villous to puberulous or occasionally glabrous but always glabrous in the connate part inside. The lateral lobes are similarly hairy, but usually slightly to considerably shorter than the upper pair, their length varying between 3—6 mm while they are as wide or but slightly narrower than the upper lobes. Lower lobe much larger (10—) 14—15 (—18) mm long and (4—) 6—8 (—10) mm wide, the tip simple and narrowly acute to bluntly rounded and distinctly 3-dentate (both extremes may be present within one inflorescence). The outside of this lobe usually forms the least hairy part of the calyx, being sparsely hairy to almost glabrous, mostly hairy in the lower $\frac{1}{2}$ and almost glabrous in the upper part. The edges are usually ciliate, often densely so, occasionally only sparsely fringed. The inside is villous, usually only in the lower $\frac{1}{2}$, the upper part or only the tip but sparsely so, glabrescent or even glabrous. In fresh flowers the calyx may be pale green to yellow, the lobes towards their tip red to dark red. *Corolla* greenish to pale yellow in colour, lacking the red tinge and markings of the other species. *Vexillum* usually (13—) 18—20 mm long, with the two successive

perpendicular bends in the first 3 mm the total width amounts to 15 mm, but the lateral margins are extremely revolute and inrolled at the back leaving hardly any expanded part of the limb, thus being only 2—4 mm wide. The lateral margins entire and the part near the apiculate tip, that may be torn, usually slightly incurving. *Alae* usually slightly shorter than the vexillum, 15—18 mm long, very distinctly clawed, the limb rather abruptly widening and oblong rectangular in shape, 2—5 mm wide, the top end rather bluntly spathulate often lacking any lobes and usually not infolding each other like the other species, but merely touching, occasionally the lobes present and infolding, rarely 3 lobular edges interlocking in a bow-tie arrangement (see Fig. in the other species). *Carina* strongly falcate, with an almost perpendicular bend near the middle, occasionally only slightly so. Almost equal to the *alae*, the total length being about $1\frac{1}{2}$ cm. These petals have a very narrow clawed base, after about 4 mm rather abruptly widening to 2—4 mm at its widest part, in the bend. The lower margins become connate in the upper $\frac{1}{3}$ to $\frac{1}{4}$, usually about 4 mm below the tip, the upper may be connate in the middle third of their length, or for a few mm in that area, always leaving the base and the very tip free. *Stamens* enveloped by the *carina*, the sheath rather short, 10 mm, and disintegrating from 7 mm on. Their total length reaching some 18 mm but shorter in the smaller flowers. They are of the usual two kinds, but in a young flower a dissimilar arrangement was noticed: the anthers of the shorter kind (including that of the vexillar stamen) perched on top of shorter filaments instead of the usual arrangement with the shorter anthers on the longer filaments. In other cases the anthers were about 1 mm long and not clearly of two kinds. *Pistil* about as long as the stamens, the hairy *ovary* but minutely stipitate and about 7 mm long, with up to 7 (?8) ovules, the style and hairy capitate stigma as in the genus. *Pod* similar to the other species and of about the same dimensions, $1\frac{1}{2}$ —2 cm long, about 9 mm high and flattened. Usually containing but one developed seed.

I have not seen any seedlings of this species.

DISTRIBUTION

From sea-level to over 300 m, restricted to the southern part of the Cape Peninsula (south of the line Chapman's Bay-Kalk Bay). One doubtful record from Klein River mountains (Caledon district). (Fig. 1).

ECOLOGY. Usually occurring in rocky places and on stony outcrops in the hills (Simonstown, Kommetjie) but occasionally in flats (Kommetjie). Solitary plants, or also as a few shrublets in a vegetation cover of equal height. Flowering specimens have been collected mainly in winter, i.e. between May and November, mostly in September, and rarely in November and May. One record of a flowering specimen collected in January.

TIPIFICATION. When publishing *L. parva*, Walpers referred to a MS. name by Vogel in the Kunth herbarium. Since this herbarium was destroyed at Berlin, and the small amount of material in the main Herbaria does not show any trace of having been studied for the original delimitation of the species, a neotype was proposed.

POLLINATION. Dr. Stephan Vogel (Bot. Stud. I: 211 (1954)) remarks that the flowers are pollinated by bees, also drawing attention to the smaller size of the flowers.

SPECIMENS EXAMINED

CAPE PROVINCE. Cape Point, *Andreae* s.n. (PRE), *Eames* s.n. (BOL). Plaatboom, *Compton* 13233 (NBG*). Smith's farm, *Andreae* 580 (PRE), *Leighton* s.n. (BOL). Taylor's beach, *Taylor* 5289 (WAG*). Buffelsbay, *Glover* s.n. (BOL). Smitswinkel, *Minicky* s.n. (SAM*), *Penfold* s.n. (NBG*), *Barker* 5910 (NBG*). Simonstown mnts., *Bodkin* s.n. (BOL), *Bolus* 4953-Fair (BOL, PRE), *Bolus* 4953-A.B. (PRE), *Bolus* 4953-H., *Bolus* (BOL), *Marloth* 7789 (PRE*), *Stokoe* s.n. (SAM*), *Wolley-Dod* 1119 (BM*, BOL), *Wright* 549 (TCD*). Klawervlei, *Esterhuyzen* 12900 (BOL), *Wolley-Dod* 804 (BM*, BOL). Klaarsjagersberg, *Sidey* 2142 (S*, neotype) MO*, WAG*, PRE*. Red Hill, *Bos* 350 (WAG*), 682 (WAG* + spirit coll.), 1407 (WAG*), 1408 (WAG*), *Rodgers* 11226 (PRE), *Pillans* 3416 (PRE). Between Scarborough and Red Hill, *Fischer* s.n. (SAM*). Schuster's River, *Lam & Meeuse* 4107 (S*, L*, MO*). Bonteberg, *Bond* 397 (NBG*). Scarborough, *Hafström & Acocks* 2320 (S*, PRE). Witsands, *Linley* s.n. (SAM*), *Penfold* 265 (NBG*), *Primos* s.n. (PRE), *Schmidt* 225 (M*). Slangkop, *Lamb* 2100 (E*). Kommetjie, *Barker* 5901 (BOL, NBG*), *Bos* 1404 (WAG*), 1405 (WAG*), 1406 (WAG*), *Galpin* 3902 (PRE), *Pillans* 10923 (MO*). Glencairn, *Stokoe* 7820 (BOL*). Fish Hoek, *Acocks* 2561 (S*), *Andreae* 571 (PRE*).

UNCERTAIN LOCALITIES. *Boivin* 569 (TCD*). "C.B.S.", *Brossard* s.n. (P*). Cap de Bonne Espérance, *Brown* s.n. (E*). S. Africa, *Carmichael* s.n. (TCD*). Cape of Good Hope, *Forbes* s.n. (K*). "C.B.S.", *Forbes* 286 (BM*). "C.B.S.", *Grey* s.n. (K*). S. Africa, *Krauss* s.n. (NY*), "Uitershoeck" (type of *L. crassineria* Meisn.), *Marloth* 7789b (PRE*). From Cape Town Flower Show 1919, Herb. *Retzius* (LD*). "C.B.S.", ?*Thunberg* s.n. (S*).

Stokoe 7822 (BOL) from Klein River mnts., Caledon district, was not closely examined by me; if it belongs to *L. parva* Vog. ex. Walp., the locality may prove to be erroneous, since *Stokoe* no. 7820 was collected on the Cape peninsula near Glencairn (see above).

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